

BLOODBORNE PATHOGENS TRAINING MODULE

March 1992, the Occupational Safety and Health Administration's (OSHA's) Bloodborne Pathogen Standard, 29 CFR 1910.1030 took effect. This standard was designed to prevent more than 200 deaths and 9,000 bloodborne infections every year. While the standard was primarily aimed at hospitals, funeral homes, nursing homes, clinics, law enforcement agencies, emergency responders, and HIV/HBV research laboratories, anyone who can "reasonably expect to come in contact with blood or potentially infectious materials" as part of their job is covered by the standard. OSHA's summary of the standard is below. This training module is designed to provide a basic understanding of bloodborne pathogens, common modes of their transmission, methods of prevention, and other pertinent information.

This Bloodborne Pathogens – Right to Know Training Module includes the following:

- Diseases
- Modes of Transmission
- PPE & Other Controls
- Signs, Labels & Color Coding
- Emergencies
- Vaccinations
- Quiz

Diseases

Bloodborne pathogens are microorganisms such as viruses or bacteria that are carried in blood and can cause disease in people. There are many different bloodborne pathogens including malaria, syphilis, and brucellosis, but Hepatitis B (HBV) and the Human Immunodeficiency Virus (HIV) are the two diseases specifically addressed by the OSHA Bloodborne Pathogen Standard.

Hepatitis B (HBV)

In the United States, approximately 300,000 people are infected with HBV annually. Of these cases, a small percentage is fatal. "Hepatitis" means "inflammation of the liver," and, as its name implies, Hepatitis B is a virus that infects the liver. While there are several different types of Hepatitis, Hepatitis B is transmitted primarily through "blood to blood" contact. Hepatitis B initially causes inflammation of the liver, but it can lead to more serious conditions such as cirrhosis and liver cancer. There is no "cure" or specific treatment for HBV, but many people who contract the disease will develop antibodies which help them get over the infection and protect them from getting it again. It is important to note, however, that there are different kinds of hepatitis, so infection with HBV will not stop someone from getting another type. The Hepatitis B virus is very durable, it can survive in dried blood for up to seven days. For this reason, this virus is the primary concern for employees such as housekeepers, custodians, laundry personnel and other employees who may come in contact with blood or potentially infectious materials in a non first-aid or medical care situation.

Symptoms of HBV are very much like a mild "flu". Initially there is a sense of fatigue, possible stomach pain, loss of appetite, and even nausea. As the disease continues to develop, jaundice (a distinct yellowing of the skin and eyes), and a darkened urine will often occur. However, people who are infected with HBV will often show no symptoms for some time. After exposure it

can take 1-9 months before symptoms become noticeable. Loss of appetite and stomach pain, for example, commonly appear within 1-3 months, but can occur as soon as 2 weeks or as long as 6-9 months after infection.

Human Immunodeficiency Virus (HIV) AIDS

Or acquired immune deficiency syndrome is caused by a virus called the human immunodeficiency virus, or HIV. Once a person has been infected with HIV, it may be many years before AIDS actually develops. HIV attacks the body's immune system, weakening it so that it cannot fight other deadly diseases. AIDS is a fatal disease, and while treatment for it is improving, there is no known cure. Estimates on the number of people infected with HIV vary, but some estimates suggest that an average of 35,000 people are infected every year in the US (in 2000, 45,000 new infections were reported). It is believed that as of 2000, 920,000 persons were living with HIV/AIDS in the United States. These numbers could be higher, as many people who are infected with HIV may be completely unaware of it. The HIV virus is very fragile and will not survive very long outside of the human body. It is primarily of concern to employees providing first aid or medical care in situations involving fresh blood or other potentially infectious materials. It is estimated that the chances of contracting HIV in a workplace environment are only 0.4%. However, because it is such a devastating disease, all precautions must be taken to avoid exposure. Aids infection essentially occurs in three broad stages. The first stage happens when a person is actually infected with HIV. After the initial infection, a person may show few or no signs of illness for many years. Eventually, in the second stage, an individual may begin to suffer swollen lymph glands or other lesser diseases which begin to take advantage of the body's weakened immune system. The second stage is believed to eventually lead to AIDS, the third and final stage, in all cases. In this stage, the body becomes completely unable to fight off life-threatening diseases and infections.

Symptoms of HIV can vary, but often include weakness, fever, sore throat, nausea, headaches, diarrhea, a white coating on the tongue, weight loss, and swollen lymph glands. ***If you believe you have been exposed to HBV or HIV, especially if you have experienced any of the signs or symptoms of these diseases, you should consult your physician or doctor as soon as possible.***

Modes of Transmission

Bloodborne pathogens such as HBV and HIV can be transmitted through contact with infected human blood and other potentially infectious body fluids such as:

- Cerebrospinal fluid (colorless liquid that surrounds the brain and spinal cord).
- Synovial fluid (fluid that lubricates and cushions the joints).
- Pleural fluid (fluid between the pleural membranes of the lung and the inner chest wall).
- Peritoneal fluid (fluid in the gastrointestinal organs).
- Amniotic fluid (fluid which surrounds the fetus).
- Semen & vaginal secretions (shared during sexual contact).
- Saliva (in dental procedures).
- Any body fluid that is visibly contaminated with blood.

It is important to know the ways exposure and transmission are most likely to occur in your particular situation, be it providing first aid to a student in the classroom, handling blood samples in a laboratory or cleaning up blood from a hallway. HBV and HIV are most commonly transmitted through:

- Sexual contact
- Sharing of hypodermic needles
- From mothers to their babies at/before birth

- Accidental puncture from contaminated needles, broken glass, or other sharps
- Contact between broken or damaged skin and infected body fluids
- Contact between mucous membranes and infected body fluids



Accidental puncture from contaminated needles and other sharps can result in transmission of bloodborne pathogens.

In most work situations, transmission is most likely to occur because of accidental puncture from contaminated needles, broken glass, or other sharps; contact between broken or damaged skin and infected body fluids; or contact between mucous membranes and infected body fluids. For example, if someone infected with HBV cut their finger on a piece of glass and then you cut yourself in the now infected piece of glass, it is possible that you could contract the disease. Anytime there is blood-to-blood contact with infected blood or body fluids, there is a slight potential for transmission. Unbroken skin forms an impervious barrier against bloodborne pathogens. However, infected blood can enter your system through:

- Open sores
- Cuts
- Abrasions
- Acne
- Any sort of damaged or broken skin such as sunburn or blisters

Bloodborne pathogens may also be transmitted through the mucous membranes of the:

- Eyes
- Nose
- Mouth

For example, a splash of contaminated blood to your eye, nose, or mouth could result in transmission.

PPE & Other Controls

It is extremely important to use personal protective equipment and work practice controls to protect yourself from bloodborne pathogens. “*Universal Precautions*” is the name used to describe a prevention strategy in which all blood and potentially infectious materials are treated as if they are, in fact, infectious, regardless of the perceived status of the source individual. In other words, whether or not you think the blood/body fluid is infected with bloodborne pathogens, you treat it as if it is. This approach is used in all situations where exposure to blood or potentially infectious materials is possible. This also means that certain engineering and work practice controls shall always be utilized in situations wither exposure may occur.

PERSONAL PROTECTIVE EQUIPMENT

Probably the first thing to do in any situation where you may be exposed to bloodborne pathogens is to ensure you are wearing the appropriate personal protective equipment (PPE). For example, you may have noticed that emergency medical personnel, doctors, nurses, dentists, dental assistants, and other health care professionals always wear latex or protective gloves. This is a simple precaution they take in order to prevent blood or potentially infectious body fluids from coming in contact with their skin. To protect yourself, it is essential to have a barrier between you and the potentially infectious material.

Rules to follow:

- Always wear personal protective equipment (PPE) in exposure situations.
- Remove PPE that is torn or punctured, or has lost its ability to function as a barrier to bloodborne pathogens.
- Replace PPE that is torn or punctured.
- Remove PPE before leaving the work area.



Gloves: should be made of latex, nitrile, rubber, or other water impervious materials. If glove material is thin or flimsy, double gloving can provide an additional layer of protection. Also, if you know you have cuts or sores on your hands, you should cover these with a bandage or similar protection as an additional precaution before donning your gloves.

You should always inspect your gloves for tears or punctures before putting them on. ***If a glove is damaged, don't use it.*** When taking contaminated gloves off, do so carefully. Make sure you don't touch the outside of the gloves with any bare skin, and be sure to dispose of them in a proper container so that no one else will come in contact with them, either.

Goggles: Anytime there is a risk of splashing or vaporization of contaminated fluids, goggles and/or other eye protection should be used to protect your eyes. Again, bloodborne pathogens can be transmitted through the thin membranes of the eyes so it is important to protect them. Splashing could occur while cleaning up a spill, during laboratory procedures, or while providing first aid or medical assistance.

Face Shields: may be worn in addition to goggles to provide additional face protection. A face shield will protect against splashes to the nose and mouth.

Aprons: may be worn to protect your clothing and to keep blood or other contaminated fluids from soaking through to your skin.

Remember to use universal precautions and treat all blood or potentially infectious body fluids as if they are contaminated. Avoid contact whenever possible, and whenever it's not, wear personal protective equipment.

If you find yourself in a situation where you have to come in contact with blood or other body fluids and you don't have any standard personal protective equipment handy, you can improvise. Use a towel, plastic bag, or some other barrier to help avoid direct contact.



HYGIENE PRACTICES

Hand washing is one of the most important (and easiest) practices used to prevent transmission of bloodborne pathogens. Hands or other exposed skin should be thoroughly washed as soon as possible following an exposure incident. Use soft, antibacterial soap, if possible. Avoid harsh, abrasive soaps, as these may open fragile scabs or other sores. Hands should also be washed immediately (or as soon as feasible) after removal of gloves or other personal protective equipment. Because hand washing is so important, you should familiarize yourself with the location of the hand washing facilities nearest to you.

Laboratory sinks, public restrooms, janitor closets, and so forth may be used for hand washing if they are normally supplied with soap. If you are working in an area without access to such facilities, you may use an antiseptic cleanser in conjunction with clean cloth/paper towels or antiseptic towelettes. If these alternative methods are used, hands should be washed with soap

and running water as soon as possible. If you are working in an area where there is responsible likelihood of exposure, ***you should never:***

- Eat
- Drink
- Smoke
- Apply cosmetics or lip balm
- Handle contact lenses

DECONTAMINATION AND STERILIZATION

All surfaces, tools, equipment and other objects that come in contact with blood or potentially infectious materials must be decontaminated and sterilized as soon as possible. ***Equipment and tools must be cleaned and decontaminated before servicing or being put back to use.*** Decontamination should be accomplished by using:

- A solution of 5.25% sodium hypochlorite (household bleach/Clorox) diluted between 1:10 and 1:100 with water. The standard recommendation is to use at least a quarter cup of bleach per one gallon of water.
- Lysol or some other EPA-registered tuberculocidal disinfectant. Check the label of all disinfectants to make sure they meet this requirement.

If you are cleaning up a spill of blood, you can carefully cover the spill with paper towels or rags, and then gently pour the 10% solution of bleach over the towels or rags, and leave it for at least 10 minutes. This will help ensure that any bloodborne pathogens are killed before you actually begin cleaning or wiping the material up. By covering the spill with paper towels or rags, you decrease the chances of causing a splash when you pour the bleach on it. If you are decontaminating equipment or other objects (be it scalpels, microscope slides, broken glass, saw blades, tweezers, mechanical equipment upon which someone has been cut, first aid boxes, or whatever) you should leave the disinfectant in place for at least 10 minutes before continuing the cleaning process. Of course, any materials you use to clean up a spill of blood or potentially infectious materials must be decontaminated immediately, as well. This would include mops, sponges, reusable gloves, buckets, pails, etc.

SHARPS

Far too frequently, custodians and other are punctured or cut by improperly disposed needles and broken glass. This, of course, exposes them to whatever infectious material may have been on the glass or needle. For this reason, it is especially important to handle and dispose of all sharps carefully in order to protect yourself as well as others.

- Needles should never be recapped.
- Needles should be moved only by using a mechanical device or tool such as forceps, pliers, or broom and dust pan.
- Needles shall be disposed of in labeled sharps containers only. Sharps containers are closable, puncture-resistant, leak-proof on sides and bottom, and must be labeled or color-coded.
- When sharps containers are being moved, the containers should be closed immediately before removal or replacement to prevent spillage or protrusion of contents during handling or transport.
- Broken glassware that has been visibly contaminated with blood must be sterilized with an approved disinfectant solution before it is disturbed or cleaned up.
- Glassware that has been decontaminated may be disposed of in an appropriate sharps container: i.e., closable, puncture-resistant, leak-proof on sides and bottom, with appropriate labels. (Labels may be obtained from OSU EHS.)

- Broken glassware will not be picked up directly with the hands. Sweep or brush the material into a dustpan.
- Uncontaminated broken glassware may be disposed of in a closable, puncture resistant container such as a cardboard box or coffee can.

By using **Universal Precautions** and following these simple work practice controls, you can protect yourself and prevent transmission of bloodborne pathogens.

Signs, Labels & Color Coding



Containers used to store, transport, or ship blood or other potentially infectious materials are identified by a warning label containing the universal biohazard symbol. These labels are fluorescent orange, red, or orange-red.

These labels identify:

- Any liquid or semi-liquid blood or other potentially infectious materials
- Contaminated items that would release blood or other potentially infectious materials in a liquid or semi-liquid state if compressed
- Items that are caked with dried blood or other potentially infectious materials and are capable of releasing these materials during handling
- Contaminated sharps
- Pathological and microbiological wastes containing blood or other potentially infectious materials

Emergencies

In an emergency situation involving blood or potentially infectious materials, you should always use the **Universal Precautions** and try to minimize your exposure by wearing gloves, splash goggles, pocket mouth-to-mouth resuscitation masks, and other barrier devices. If you are exposed, you should:

- Wash the exposed area thoroughly with soap and running water. Use non-abrasive, antibacterial soap if possible.
- If blood is splashed in the eye or mucous membrane, flush the affected area with running water for at least 15 minutes.
- Report the exposure to your supervisor as soon as possible.

Vaccinations

Employees who have routine exposure to bloodborne pathogens (such as doctors, nurses, first aid responders, etc.) must be offered the Hepatitis B vaccine series at no cost to themselves unless:

- They have previously received the vaccine series
- Antibody testing has revealed they are immune
- The vaccine is contraindicated for medical reasons

In these cases they need not be offered the series. Although your employer must offer the vaccine to you, you do not have to accept that offer. You may opt to decline the vaccination series, in which case you will be asked to sign a declination form. **Even if you decline the initial offer, you may choose to receive the series at anytime during your employment thereafter.** For example, if you are exposed on the job at a later date. If you are exposed to blood or potentially infectious materials on the job, you may request a Hepatitis B vaccination at that time. If the vaccine is administered immediately after exposure it is extremely effective at preventing the disease. The Hepatitis B vaccination is given in a series of three shots. The second shot is given one month after the first, and the third shot follow five months after the second. This series gradually builds up the body's immunity to the Hepatitis B virus. The vaccine itself is made from yeast cultures; there is no danger of contracting the disease from getting the shots, and, once vaccinated, a person does not need to receive the series again. There are booster shots available, however, and in some instances these may be recommended (for example, if there is an outbreak of Hepatitis B at a particular location).

Quiz

1. If you are exposed to potentially infectious materials on the job, you may request a vaccine for which bloodborne disease?
 - a. HIV
 - b. Syphilis
 - c. Hepatitis B
 - d. Brucellosis
2. Which of the following could contain bloodborne pathogens?
 - a. Bloody saliva
 - b. Sexual contact
 - c. Bloody urine or feces
 - d. All of the above
3. If you wear gloves when cleaning up an accident site, it is not necessary to wash your hands afterwards.
 - a. True
 - b. False
4. Bloodborne pathogens may enter your system through:
 - a. Open cuts
 - b. Skin abrasions
 - c. Dermatitis
 - d. Mucous membranes
 - e. All of the above
5. You should treat all body fluids as if they are infectious and avoid direct skin contact with them.
 - a. True
 - b. False
6. You should never eat, drink, or smoke in a laboratory or other area where there may be potential exposure to bloodborne pathogens.
 - a. True
 - b. False
7. If you have blood or potentially infectious materials splashed into your eye, you should flush your eye with clean, running water for:
 - a. 2 minutes
 - b. 5 minutes
 - c. 10 minutes
 - d. 15 minutes
8. Uncontaminated sharps may be disposed in regular trash bags.
 - a. True
 - b. False
9. A quarter cup of household bleach to one gallon of water provides a strong enough solution to effectively decontaminate most surfaces, tools, and equipment if left for 10 minutes.
 - a. True
 - b. False
10. Unbroken skin forms an impervious barrier against bloodborne pathogens.
 - a. True
 - b. False